Explaining shapes and polarity of molecules

Answer the following questions in as much detail as you can

**1)** The Lewis diagrams for SF4 and XeF4 are shown below.



Compare and contrast the polarities and shapes of these two molecules.

**2)** The Lewis structures for the two molecules PCl3 and PCl5 are shown below. Compare and contrast the shapes and the polarities of these two molecules.

|  |  |
| --- | --- |
| **PCl3** | **PCl5** |
| Chemistry 3 | Chemistry 3 |

**3)** The Lewis diagrams for ClF3 and AsF5 are shown below. Compare and contrast the shape and polarity of these molecules.



**4)** The Lewis diagrams for IF5 and PCl5 are shown below. Discuss the polarities of these molecules.



**5)** Discuss the fact that although both SF4 and XeF4 have four bonds around the central atom, the molecules have different shapes and polarities.

**6)** Compare the polarities of the two molecules, BrF3 and SF6.

**7)** **a)** The drawings below are three possible shapes for a molecule ZF4, where ‘Z’ represents the central

element. ‘Z’ has lower electronegativity than F. Name the shapes represented by the three diagrams.



A B C

Explain why C is the only shape that can give rise to a polar molecule for ZF4.

**b) i)** Draw the Lewis diagram for the ion BrF4–

**ii)** Choose the structure for the BrF4– ion from those pictured in part (a). Give a reason for your answer.

**c)** Circle the element, from the following list, which would be the central element Z in a molecule ZF4 that

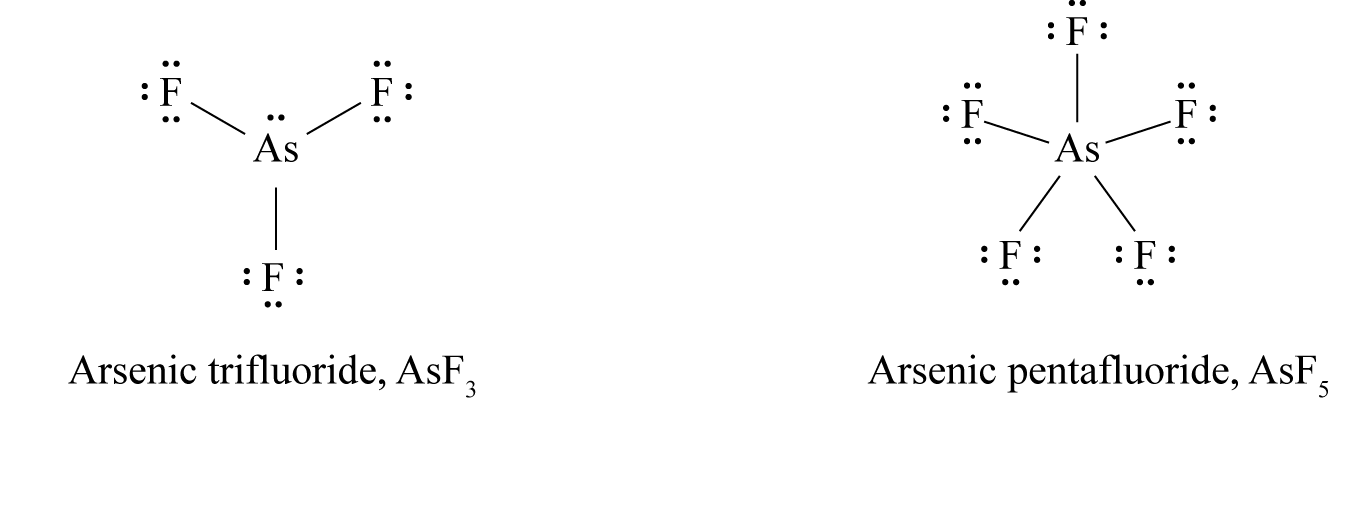
has shape C (see part(a)). **Be C Se Si Xe** Justify your answer.

**8)** Discuss the polarities of AsF3 and AsF5 molecules. Your discussion should include:

- justification for the molecular shape and

- relative electronegativies of the atoms within the molecule.

The Lewis structures for each molecule are shown below.



**9)** Discuss reasons for the difference in the polarities of BF3 and PF3 molecules.

© 2014 <http://www.chemicalminds.wikispaces.com>

NCEA questions and answers reproduced with permission from NZQA